Bringing Greenhouse Gas Benefits to Market: Nutrient Management for Nitrous Oxide Reductions

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Total Project: $840,000; $400,000 in USDA NRCS funding

Location: Illinois, Michigan, Oklahoma

Project Description: The primary objective of this three-year project is to support farmer implementation of innovative nutrient management practices through greenhouse gas (GHG) credit markets.

Our team is working with farmers and agricultural consultants to test a range of models and protocols to estimate and credit on-farm nitrous oxide (N_2O) emission reductions, with the ultimate goals of generating revenue for conservation and translating the outcomes to a broader policy context. Building on Delta's experience as an aggregator on the Chicago Climate Exchange, the team is using multiple outreach mechanisms and implementation strategies to identify and overcome barriers to farmer participation. The initial focus has been on cross-promoting the emerging N_2O credit opportunity with farmer groups participating in existing conservation initiatives, including the MRBI-supported Indian Creek and Upper Salt Fork subwatersheds in Illinois and Oklahoma's 319 Nonpoint Source Management Program. As EQIP funds are made available, we will expand our reach throughout the three focus states.

To enroll farmers, the project team is adapting the user-friendly COMET-FARM tool to collect basic field location and management data required by the American Carbon Registry (ACR), Climate Action Reserve (CAR), and Verified Carbon Standard (VCS) protocols. This data will be used to run the DeNitrification-DeComposition (DNDC) model, the basis of ACR's "4R" protocol adopted in 2010, as well as to generate credits under the formula-based nitrogen rate reduction approach recently adopted by ACR and CAR.

Summary of Progress to Date: In testing and evaluating the three agricultural N_2O protocols adopted to date, our team has made progress in several areas:

- Analyzing protocol requirements and clarifying data needs to farmers and their stakeholders
- Creating a standardized field data collection process to minimize input time and streamline credit generation, starting with a web-based form and evolving to an open-source software tool
- Providing recommendations to NRCS staff and Colorado State University developers around expanding COMET-FARM's functionality, supported by Terra Global Capital and DNDC-ART
- Leveraging watershed-focused workshops and field demonstrations in Illinois to educate farmers interested in nutrient management BMPs about the opportunity to earn GHG credits
- Recruiting wheat growers in Oklahoma using variable rate technologies, including GreenSeeker
- Working with Michigan State University researchers to register the first agricultural N_2O project, using their methodology developed in partnership with the Electric Power Research Institute

Across these areas, the project team has found that having appropriate technology and building from locally-led efforts are essential to encouraging farmer participation. We have also discovered that the highly-variable, incremental nature of enhancing management practices is often at odds with the prescriptive, whole-farm focus of GHG markets. Furthermore, the model-based quantification approach is compromised by a lack of field measurement data for many crops, practices, and regions.